BISS Biodiversity Information Science and Standards

Biodiversity Information Science and Standards 7: e112545
doi: 10.3897/biss.7.112545

OPEN ACCESS

Conference Abstract

Synergizing Digital, Biological, and Participatory Sciences for Global Plant Species Identification: Enabling access to a worldwide identification service

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Received: 11 Sep 2023 | Published: 12 Sep 2023

Citation: Bonnet P, Affouard AA.A, Lombardo J-CJ.-C, Chouet M, Gresse H, Hequet V, Palard R, Fromholtz M, Espitalier V, Goëau HH.G, Deneu B, Botella C, Estopinan J, Leblanc C, Servajean M, Munoz F, Joly AA.J (2023) Synergizing Digital, Biological, and Participatory Sciences for Global Plant Species Identification: Enabling access to a worldwide identification service. Biodiversity Information Science and Standards 7: e112545. https://doi.org/10.3897/biss.7.112545

Abstract

Human activities have a growing impact on global biodiversity. While our understanding of biodiversity worldwide is not yet comprehensive, it is crucial to explore effective means of characterizing it in order to mitigate these impacts. The advancements in data storage, exchange capabilities, and the increasing availability of extensive taxonomic, ecological, and environmental databases offer possibilities for implementing new approaches that can address knowledge gaps regarding species and habitats. This enhanced knowledge will, in turn, facilitate improved management practices and enable better local governance of

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territories. Meeting these requirements necessitates the development of innovative tools and methods to respond to these needs.

Citizen science platforms have emerged as valuable resources for generating large amounts of biodiversity data, thanks to their visibility and attractiveness to individuals involved in territorial management and education. These platforms present new opportunities to train deep learning models for automated species recognition, leveraging the substantial volumes of multimedia data they accumulate. However, effectively managing, curating, and disseminating the data and services generated by these platforms remains a significant challenge that hinders the achievement of their objectives. In line with this, the GUARDEN and MAMBO European projects aim to utilize the PI@ntNet participatory science platform (Affouard et al. 2021) to develop and implement novel computational services to enable the widespread creation of floristic inventories.

In the pursuit of this project, various standards and reference datasets have been employed, such as the POWO (Plants of the World Online) world checklist and the WGSRPD (World Geographical Scheme for Recording Plant Distributions) standard, to establish a foundation for creating a global service that aids in plant identification through visual analysis. This service relies on a NoSQL (Not Only Structured Query Language) data management system ArangoDB (Arango Database), utilizes state-of-the-art automated visual classification models (vision transformers), and operates on a distributed IT (Information Technology) infrastructure that leverages the capabilities of collaborative stakeholders interested in supporting this initiative.

Global-scale automated workflows have been established specifically for the collection, analysis, and dissemination of illustrated occurrences of plant species. These workflows now enable the development of new IT tools that facilitate the description and monitoring of species and habitat conservation statuses. A comprehensive presentation highlighting the significant advancements achieved will be provided to share the lessons learned during its development and ensure the widespread adoption of this service within the scientific community.

Keywords

citizen science, plant species identification, deep learning-based species identification, big data

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Presented at

TDWG 2023

Funding program

The research described in this paper was funded by the European Commission via the GUARDEN and MAMBO projects, which have received funding from the European Union's Horizon Europe research and innovation programme under grant agreements 101060693 and 101060639. The opinions expressed in this work are those of the authors and are not necessarily those of the GUARDEN or MAMBO partners or the European Commission.

Conflicts of interest

The authors have declared that no competing interests exist.

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